

# TOMATO RESEARCH IN ENGLAND

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**T**HE major centre of tomato research in Great Britain is the Cheshunt Station, in the Lea Valley some 15 miles north-east of London. Other important work on tomatoes is carried out at the John Innes Horticultural Station at Merton, Surrey, and at the Long Ashton Fruit Station, near Bristol.

**A**T the Cheshunt Station investigations on tomatoes, cucumbers, and flower culture have proceeded for more than 25 years under the able direction of Dr. Bewley. The work has included tests for soil disinfection with both steam and chemicals, the manuring of glasshouse crops, the value of organic and synthetic nitrogenous manures, the breeding of improved varieties of tomatoes, and the study and control of fungous, virus, and insect diseases.

## Steam Sterilisation

After many years' experience of steam and chemical soil disinfectants, Dr. Bewley considers that steam treatment is the more effective. Steam treatment of glasshouses every other year is now recommended, in contrast to the previous procedure of steaming once in 3 or 4 years. Under Nelson conditions the investigations of the Cawthron Institute have shown the importance of annual steam treatment in maintaining tomato production.

This difference in procedure in the two countries is possibly connected with the more effective but more expensive method of steam sterilisation adopted at Cheshunt. In England the top spit of soil is removed, the subsoil forked up, and the steam grid then laid in the trench and covered with 12in. of soil from the next spit. Steam is passed through the grid at a pressure of not less than 80lb. a square inch for a minimum of 10 minutes. The longer time of steaming under English conditions and the penetration of the steam upward probably ensure more effective sterilisation than under Nelson conditions of soil steaming.

## Manurial Treatment

Early experiments at the Cheshunt Station showed the great importance of all three plant nutrients, nitrogen, phosphate, and potash. Potash appeared to have a special value in reducing blotchy ripening of the fruit and in safeguarding the plants against certain virus diseases.

Present manuring practice at Cheshunt is on a very liberal scale, but a crop of lettuces follows tomatoes and manurial treatment is designed to cover the needs of both crops. About

14 tons of horse manure an acre is used in the first digging of the house, together with 8oz. of superphosphate or bone and 4oz. of sulphate of potash to the square yard. After planting of the tomatoes, a topdressing of 2oz. of sulphate of potash to the square yard is used early in the season. Further topdressings of a mixed fertiliser containing superphosphate, sulphate of potash, and dried blood are given during the fruiting of the plants until a total of 8oz. of the mixed fertiliser to the square yard has been applied.

Under this manurial programme the plants make heavy growth and as many as 13 trusses of fruit are formed. Top growth is heavy. The plants have less fruit to the truss than in Nelson, but the yield for each plant, 8lb., is about the same as the average in tomato houses in Nelson.

**Though the results obtained in England with this treatment are good, there is some evidence that the very liberal use of potassic fertilisers on the soils of the station is bringing about a magnesium deficiency, symptoms of which were noticed at both the Cheshunt and the John Innes Horticultural Stations.**

In the tests of organic and synthetic nitrogenous manures carried out at Cheshunt Station little difference in the growth and yield of tomatoes was noticed for the first 8 years of the experiment, but more recently the plots with organic nitrogen have shown to great advantage over those treated with synthetic nitrogen. As superphosphate and sulphate of potash were used on both series of plots, it seems clear that the use of dried blood on one set of plots has resulted in better soil conditions than has the continued use of synthetic nitrogen in the form of ammonium sulphate.

The reasons for the superiority of the dried blood are not clear, but it is suggested that the bacterial flora is better with dried blood than with ammonium sulphate. Another possible explanation of the poorer growth with synthetic nitrogen is a higher deficiency of magnesium brought about by the liberal use of potassic manures without any replenishment of magnesium.

Modern glasshouses in the Lea Valley are similar in design to Nelson houses, but the English houses are always heated. A temperature of 65 degrees F. is maintained at night and during cold periods, which are frequent in the early English summer. Uniform temperature is considered most important for the satisfactory growth of tomatoes, and both too low temperatures and intense sunlight should be avoided.

Tomatoes in the Lea Valley are planted out in the glasshouses in the third week of March. The plants are stopped in August, but picking of fruit is continued in September and October. As soon as the fruit has been harvested the houses are dug and planted to lettuce, which occupy the houses during the winter. As a rule 16,000 plants are grown to each acre of glasshouse. The plants are spaced 14in. apart in the rows, which are separated by 18 and 27in., alternately, the wider spaces being used for picking the crop.

A noticeable feature of the English houses is the wider central aisle running the full length of the house. The final effect of the English spacing is a somewhat similar number of plants to that grown in Nelson houses.

## Developing Varieties

The Cheshunt Station has always taken a keen interest in testing varieties of tomatoes and in breeding improved strains or varieties. Potentate, which is now grown in Nelson, is one of the tomatoes produced at Cheshunt. At present Dr. Bewley is working on a mould-resistant variety which is called E.S.

**Potentate and Child's Special are perhaps the best of the glasshouse varieties grown at the station, and Radio and Queen show distinct promise for outside culture.**

## Blotchy Ripening

Lack of uniformity in the ripening of tomatoes has always been a difficulty in the English climate. The amount of blotchy ripening may vary in different seasons from 10 to 30 per cent. It is always worse, possibly because of shading, on the bottom two or three trusses than on those higher up the plants.

The condition known as blotchy ripening in England includes at least two different types of blotchiness on the skin of the tomato. The most common form is unequal colouring, not accompanied by necrosis in the tissue of the tomato; this form has been controlled to a considerable extent by the use of potassic manures. Another type of blotchy ripening is that associated with necrosis of the fibro-vascular system in the flesh of the tomato, and is similar to "cloud" in Nelson. As far as can be ascertained this type of blotchy ripening is not